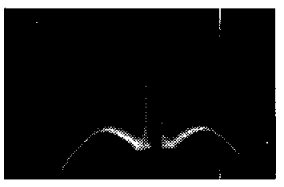
NASA
National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas



How tough is it?

JSC engineers are busy reviewing data from STS-46 Evaluation of Oxygen Interaction with Materials experiment. Story on Page 3.

THE STATE OF THE AGENCY

Televised address

Daniel Goldin will present the "State of the Agency" at 8:30 a.m. Tuesday on NASA Select with viewing in Teague Auditorium.

Space News Roundup

Vol. 31 | October 9, 1992 | No. 39

Shuttle cosmonauts to arrive at JSC this month

NASA, Russian Space Agency sign pacts

NASA and the Russian Space Agency signed two cooperative agreements Tuesday in Moscow involving human space flight and Mars exploration.

"Signing these two agreements is the next crucial step in expanding cooperative space activities with our Russian partners. We are very anxious to begin working on these important programs," said NASA Administrator Daniel S. Goldin.

The Human Space Flight Agreement outlines the flight details of a Russian cosmonaut on the U.S. space shuttle, the flight of a U.S. astronaut on the Russian Mir space station and a joint mission including the rendezvous and docking of the shuttle with Mir.

The Mars '94 agreement is for the flight of two U.S./NASA scientific instruments on the Russian Mars '94 lander.

The agreements were signed by Goldin and RSA Director Yuri Koptev during the first annual U.S./Russian Space Policy Consultations.

Ambassador Frank Wisner, under secretary of state, headed the U.S. delegation and met

Please see **U.S.**, Page 4

Pair will train for STS-60 in November '93

Two Russian cosmonauts got the nod Tuesday to begin training as candidates to fly on a space shuttle mission in November 1993.

Sergei K. Krikalev and Col. Vladimir G. Titov are scheduled to arrive at JSC this month to begin mission specialist training on shuttle systems, flight operations and manifested payload procedures. One cosmonaut will be designated the prime crew member, and the other will be designated as his backup.

"We are delighted with the selection of these two outstanding cosmonauts and look forward to their impending arrival at NASA's Johnson Space Center," NASA Administrator Daniel S. Goldin said in an Oct. 5 letter to Yuri N. Koptev, director-general of the Russian Space Agency.

The flight of a cosmonaut on the STS-60 mission is one element of the Implementing Agreement on NASA/RSA Cooperation in Human Space Flight that was signed Tuesday by Goldin and Koptev in Moscow.

Titov, a colonel in the Soviet Air Force, was born Jan. 1, 1947, in the town of Sretensk, Chitinck region. He graduated from the Higher

Please see **COSMONAUT**, Page 4

Commander says economics shortened 'cloak'

The crew of *Discovery*'s next mission said Tuesday that economy is the main reason the upcoming STS-53 Department of Defense mission won't be under a total "cloak of secrecy."

"The major classification of the primary payload is no different than it had been on previous classified missions," said Commander Dave Walker of the DOD-1 satellite that will be deployed early in the mission. "What we've done is remove from the flight the overall cloak of secrecy that was the hallmark of previous classified missions. That was mostly done in the interest of economy and in light of the changing world situation."

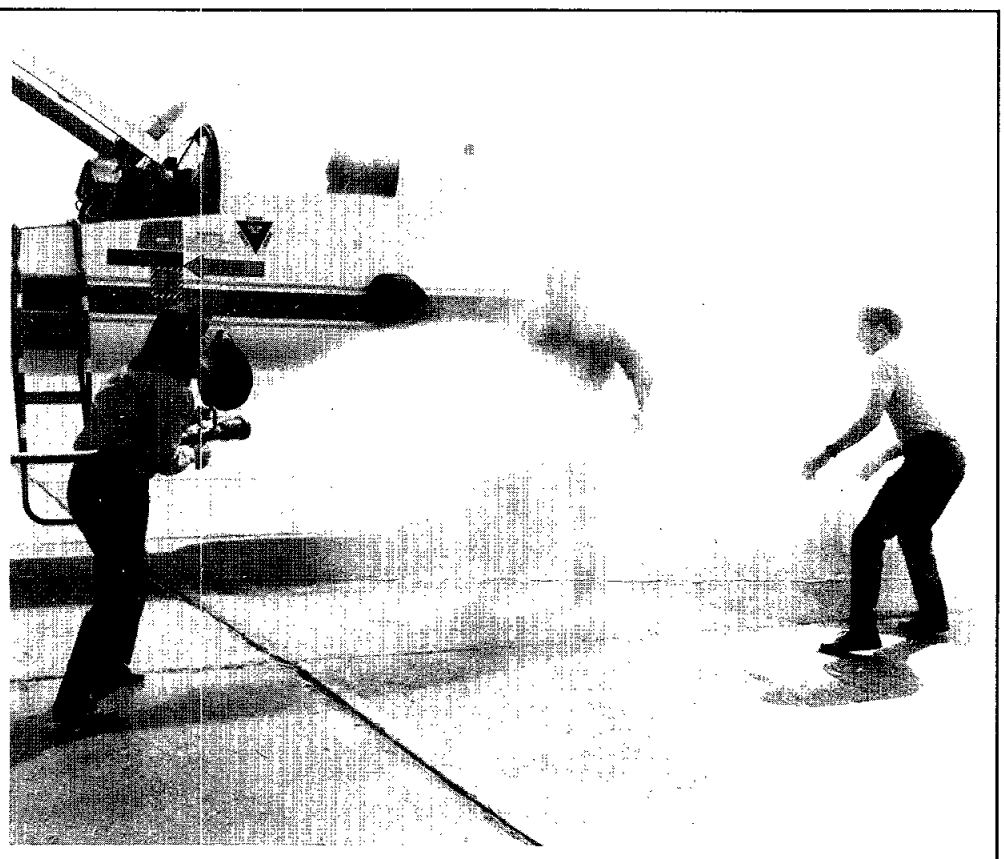
STS-53 DISCOVERY

STS-53 is scheduled for launch at 5:45 a.m. CST Nov. 14 aboard the Space Shuttle *Discovery*. In addition to DOD-1, the crew will work with the GLOW/Cryogenic Heat Pipe Experiment, Orbital Debris Radar Calibration Spheres and a number of military and human physiology experiments.

"We're going to be busy up there for the whole time we're up, and we're going to do a lot of good things," said Pilot Bob Cabana.

The commander and pilot won't be watching over the first shuttle automatic landing, as had been planned for this flight. The decision to cancel the autoland development test objective was made about three weeks ago, Walker said, and has significantly lightened the crew's training bur-

Please see **STS-53**, Page 4



JSC Photo by Jack Jacob

FIRE HOSE FAREWELL — Astronaut Kathy Thornton hoses down Astronaut Office Chief Dan Brandenstein at Ellington Field on the occasion of his last day working for NASA. Brandenstein, a veteran of four shuttle missions and chief of the astronaut office since 1987, decided to leave NASA effective Oct. 1 to pursue other interests. Helping Thornton with the hosing is Astronaut Kevin Chilton. Both Thornton and Chilton were members of Brandenstein's STS-49 crew, which retrieved and repaired the Intelsat-VI satellite using the first-ever three-person space walk.

Shuttle managers slate *Columbia*'s launch for Oct. 22

By James Hartsfield

With an engine swap on *Columbia* complete, shuttle managers set Oct. 22 as the STS-52 launch date following Tuesday's final review of mission preparations.

Columbia and crew — Commander Jim Wetherbee, Pilot Mike Baker, Mission Specialists Lacy Veach, Bill Shepherd and Tammy Jernigan, and Payload Specialist Steve MacLean — are slated for a 10:16 a.m. CDT liftoff from Pad 39B.

STS-52 COLUMBIA

Early this week, technicians wrapped up the replacement of one of *Columbia*'s main engines due to a dubious weld discovered on the original engine. A leak check of the new engine was successfully completed Wednesday. Later in the week, fuel for the on-orbit propulsion system was loaded on board and preparations were made for a final test of connections between the Laser Geodynamics Satellite-II and the Italian Research Interim Stage that will loft it to its final orbit.

Elsewhere, *Atlantis* is scheduled to make a terrestrial flight beginning Oct. 17 to Palmdale, Calif., atop the 747 Shuttle Carrier Aircraft. *Atlantis* will be out of service for about one year as it undergoes extensive inspections, upgrades and modifications.

Discovery also will be moving soon as the spacecraft is rolled Oct. 20 from its processing hangar to KSC's Vehicle Assembly Bldg. to be mated with the solid rockets and fuel tank for STS-53.

NASA to begin microwave search for inhabited planets

On Monday, NASA will begin the most comprehensive search ever conducted for evidence of intelligent life elsewhere in the universe.

The search will use telescopes and antennas to detect radio transmissions from other planetary systems.

"In the first few minutes, more searching will be accomplished than in all previous searches combined," according to Dr. John Billingham of NASA's Ames Research Center.

"Over the past few decades, "Billingham added, "scientific opinion has increasingly supported the theory that complex life may have evolved on planets orbiting other stars in the galaxy and the universe. In some cases, further evolution may have led to the emergence of intelligence, culture and technology."

Billingham said the High Resolution Microwave Survey consists of two parts — a Targeted Search and a Sky Survey.

The Targeted Search will use the largest available radio telescopes around the world to seek a variety of patterns that may indicate the presence of an artificially generated signal from solar-type stars less than 100 light-years distant. It begins from the world's largest radio telescope at the National Astronomy and Ionosphere Center's Arecibo Observatory

Please see **SEARCH**, Page 4

NASA gets $14.3 billion

Bush signs spending bill with $2.1 billion for station

President Bush signed into law an $86.9 billion appropriations bill Tuesday that includes $2.1 billion for Space Station *Freedom*.

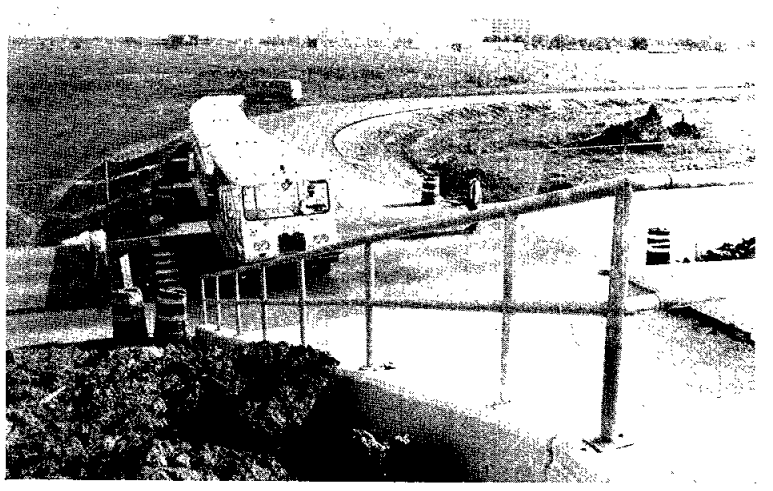
The spending measure includes a total of $14.3 billion for NASA programs.

Included in the NASA appropriation is $7.09 billion for research and development, $5.086 billion for space flight control and data communications (with $2.940 billion for space shuttle operations), $525 million for construction of facilities, $1.6 billion for research and program management, and $15.1 million for the Office of the Inspector General.

Bush said he was pleased that the appropriations bill for Veterans Affairs, Housing and Urban Development and Independent Agencies met his request for space station.

The spending measure was a compromise adopted by a House-Senate conference committee that resolved the differences in the House's appropriation bill, which included $1.73 billion for space station, and the Senate's, which approved $2.1 billion for *Freedom*.

The House's initial mark followed a heated debate about the wisdom of continuing the space station project in light of other national budget priorities.



JSC Photo by Bob Walck

GETTING READY — Space Center Houston tram drivers practice their routes in preparation for Thursday's grand opening. This weekend, employees will get to inspect the "experience center."

Leadership medal surprises Young

Astronaut John Young was awarded the NASA Outstanding Leadership Medal by NASA Administrator Daniel S. Goldin in a surprise ceremony late last week at NASA Headquarters.

"Today we're here to honor one of NASA's finest and an authentic American hero if there ever was one," Goldin said. "John Young first became an astronaut 30 years ago - September 1962 - back in the days when we were still flying Mercury spacecraft. He had the right stuff back before we even had a name for it."

"His first flight in space was with Gus Grissom aboard the very first Gemini flight," Goldin continued. "Later he flew with Mike Collins on

Please see **YOUNG**, Page 4

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays. For more information, call x35350 or x30990.

Texas Renaissance Festival (9 a.m.-6 p.m. weekends through Nov. 15): adult, $9.25; child (5-12): $5.55. Festival bus trip (Oct. 24, Nov. 7): one-day trip; adult, $15; child (ages 5-12), $10; child (under 5), $7.

Space Center Houston — Commemorative tickets available at $8.75.

Metro tickets — Passes, books and single tickets available.

Fiesta Texas Park (San Antonio): Buy one, get one free. Adult, $19.50; child 4-11, $13.55.

Sea World (San Antonio): Adult, $18.90 (child free with paying adult); child 3-11, $13.55.

Astroworld: $16.95 and $14.95 (child under 54 inches), $44.95 (season pass).

Six Flags: $16.95 (one-day) and $22.95 (two-day).

Movie discounts: General Cinema, $4; AMC Theater, $3.75; Loews Theater, $4.

Stamps, Walt Disney Club memberships also available.

JSC

Gilruth Center News

Sign up policy — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

EAA badges — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday through Friday. Dependents must be between 16 and 23 years old.

Weight Safety — Required course for employees wishing to use the Gilruth weight room is offered from 8-9:30 p.m. Oct. 20. Pre-registration is required; cost is $5.

Defensive driving — Course is offered from 8 a.m.-5 p.m. Nov. 7. Cost is $19.

Aerobics — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is $32 for eight weeks.

Exercise — Low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is $24.

Aikido — Martial arts class meets Tuesdays from 6:15-8 p.m. Cost is $15 per month.

Fitness program — Health Related Fitness Program includes medical examination screening, 12-week individually prescribed exercise program. Call Larry Weir, x30301.

Fiction Workshop — A five-week fiction workshop will be offered from 6:30-9 p.m. Wednesdays at the Gilruth Center beginning Oct. 7. Cost is $80.

Volleyball workshop — A volleyball workshop will be offered Saturdays from Oct. 3 -Nov. 21. A women's session will be held from 12-2 p.m., and a men's session from 2-4 p.m. Cost for the six-week course is $25.

Intercenter Run — JSC runners may now participate in the fall Intercenter Run competition among NASA centers. Participants may run or walk a two-mile or 10-kilometer course and turn their times into the Gilruth Center. All eligible participants will receive a free T-shirt.

JSC

Dates & Data

Today

Cafeteria menu — Special: meat sauce and spaghetti. Entrees: baked scrod, liver and onions, fried shrimp. Soup: seafood gumbo. Vegetables: green beans, buttered broccoli, whipped potatoes.

Saturday

Space Center Houston — JSC and contractor employees who have obtained vouchers for visits to Space Center Houston may visit the new visitor center Oct. 10-12. Voucher holder must attend on the day indicated or trade their vouchers with other employees. Retirees may obtain vouchers by calling the NASA Exchange manager at x38970.

Monday

Columbus Day — Most JSC offices will be closed in observance of the Columbus Day holiday.

Tuesday

Cafeteria menu — Special: pepper steak. Entrees: fried shrimp, pork chop with applesauce, turkey a la king. Soup: celery. Vegetables: au gratin potatoes, breaded squash, buttered spinach.

Wednesday

PSI meets — The Clear Lake/NASA Area Chapter of Professional Secretaries International will meet at 5:30 p.m. Oct. 14 at the Holiday Inn on NASA Road 1. Mario Gomez, a career communications professional and media specialist, will discuss the secretary's responsibilities when the media is involved. For more information, call Bonnie House at 676-3764.

Astronomy Seminar — JSC Astronomy seminars will host an open discussion luncheon meeting from noon to 1 p.m. Oct. 14 in Bldg. 31, Room 129. For more information, contact Al Jackson at 333-7679.

Toastmasters meet — The Spaceland Toastmasters Club will meet at 7:15 a.m. Oct. 14 in the Bldg. 3 cafeteria. For more information, call Darrell Boyd at x36803.

Cafeteria menu — Special: Mexican dinner. Entrees: fried catfish with hush puppies, braised beef ribs. Soup: seafood gumbo. Vegetables: Spanish rice, ranch beans, buttered peas.

Thursday

Lunch and learn — The American Institute of Aeronautics and Astronautics Materials, Structures and Dynamics Committee will present a lunch and learn session at 11:30 a.m. Oct. 15 in Lockheed Plaza I, Room 12C. James Visentine of JSC's Structures and Mechanics Division will present "A Tutorial Review of Space Shuttle Glows." For more information, call Steve Scheer at 333-6186, or Gillian Shepard at 333-6239.

Cafeteria menu — Special: hamburger steak with onion gravy. Entrees: corned beef with cabbage and new potatoes, chicken and dumplings, tamales with chili. Soup: split pea. Vegetables: navy beans, buttered cabbage, green beans.

Oct. 16

COD Chili Cook-Off — The Center Operations Directorate will hold its fourth annual COD Chili Cook-Off at 4 p.m. Oct. 16 at the Gilruth Center. Public tasting begins at 7 p.m. The public is invited. Tickets at $3 through Oct. 13, and $5 after; contact COD personnel. For more information, call Ginger Gibson at x30596.

Book signing — Artist Robert McCall will autograph copies of his new book, "The Art of Robert McCall" from 7-9 p.m. Oct. 16 at Jeremy's Bookshelf, 2441 Bay Area Blvd.

Mars vehicle — Volunteers of the Mars Mission International non-profit educational organization will display a one-sixth scale model of their Mars interplanetary vehicle all day Oct. 16 in Rocket Park. For more information, call Donna Maloy at 333-6428, or Joe Moetteli at 283-5060.

Cafeteria menu — Special: barbecue link. Entrees: deviled crabs, broiled codfish, liver and onions. Soup: seafood gumbo. Vegetables: buttered corn, green beans, new potatoes.

Oct. 21

Lunch and learn — The American Institute of Aeronautics and Astronautics Ground Testing and Simulation Technical Committee will meet at 11:30 a.m. Oct. 21 in the Bldg. 3 Cafeteria. Carmel Asuncion of Rockwell International will discuss the "Active Thermal Control Subsystem for the Orbiter." For more information, call Dr. Sivaram Arepalli at x35910.

Astronomy Seminar — JSC Astronomy seminars will host an open discussion luncheon meeting from noon to 1 p.m. Oct. 21 in Bldg. 31, Room 129. For more information, contact Al Jackson at 333-7679.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Lease: Almeda Mall, 3-2-2, Green Arbor, $625/mo. Minh, 333-6806 or Oanh, 484-2456

Lease: Heritage Park, 3-2-2, formal, breakfast area, fenced, patio, cul-de-sac, refrig, no pets, $695/mo. 482-6609.

Lease: Heritage Park, new section, 3-2-2, avail Nov, no pets, $750/mo + dep. x35021 or 486-7268.

Sale: Sagemont, 3-2-2A, 1800 sq ft, lg master w/sitting area, formal, custom wall finish & drapes, 3 fans, lg. brick FPL, built-in gas grill, in-ground pool, 14' x 22' x 9' w/diving bd, gar dr openers, $80K, VA assumption. Barbara, 481-9401.

Rent: Lake Travis cabin, private boat dock, CA/H, fully equipped, accomodates 8, fall & winter, $325/80 wkly/daily. 474-4922.

Sale: Omega Bay, water front lot, all city utilities. 409-935-9250.

Sale: Lux French country estate, 4-3.5-3D, 3478 sq. ft., located on 5.7 ac, another 5.3 acre avail, $365K. x39250 or 996-8471.

Rent: Heights, 3 rm efficiency, full kitchen, bath, cov parking. Mike, 283-5890 or 868-5132.

Sale: Lake Livingston, water front lot, 70 x 220, cleared, except for trees, $11K OBO. 332-7788.

Rent: Baywind II, 1 BR, W/D, $400 + last month, upstairs, avail Oct. 282-4450 or 480-1905.

Rent: Galv beach house, D/W, central air, furn.; 3-2-1, CA/H, furn. Ed Shumilak, x37686.

Sale: Lake Livingston, 3-2, 14 x 80 MH, wooded lot, all util, 15 x 20 raised deck, private boat launch access, $19.9K. Michelle, x36792 or 326-3447.

Sale: Palacios, bay house, sleeps 6, on water, marina. 235-5646 or 272-8525.

Sale: Alvin, 2-1-1, 5 acres, fenced, trees, barn, horse stalls, pecan/pear orchard, $115K. Scott, 331-6847.

Lease: Friendswood, condo, 3-2-2A, $825/mo, equal dep, water paid, no pets. 482-1685.

Sale: Clear Lake, 1-1, W/D, refirg, alarm, FPL, $26.9K OBO; SW Houston, 2-2 condo, W/D, refrig, patio, FPL, $29.9K. 280-9740.

Cars & Trucks

'90 Sunbird, Le, 2 dr, red, AM/FM/cass, $6K. Brenda, x35965 or 280-0757.

'78 Corvette, low miles, mech perfect, ex cond., $4750. Mandell, 283-5458.

'85 Toyota Mr2, 80K mi, loaded, custom wheels, cellular phone, ex cond, $5K w/o phone, $4850. 282-4587.

'86 Pontiac Grand Am, V6, auto, 4 DR, tilt, cruise, new A/C compressor, $3450. Jeri, 333-7552.

'89 Ford Probe, GT, 5 spd, pwr, gray int, blk, ex cond, 40K mi. 482-3015.

'63 Corvette, split window coupe, red, factory AC, 4 spd, pwr, $25K. x38843 or 332-6153.

'82 Vanagon L camper, rebuilt, remodelled, 10K new miles, $5.5K. Mike, 283-5890 or 868-5132.

'91 Nissan PU, standard, AC, bedliner, toolbox, towbar, 20K mi, ex cond, $7.2K. Rob, x34621 or 980-7481.

'87 Ford Bronco II, XLT, 2 tone paint, loaded, new batt, running boards, 72K mi, $6.2K. Rich Delgado, x38519 or 996-7630.

'91 Ford Escort LX, 28K, AC, auto, AM/FM/cass, tint, metallic blue, $6K. 283-1937 or 332-8464.

'86 Frod Bronco XLT, 4WD, low miles, AC, stereo, ex cond, $7.5K OBO. Ignacio, 486-1078 or 282-3661.3.8L V6 engine, car is shot, eng is not, make offer. Mike, x36145 or 538-4103.

'91 Mustang GT, 26K mi, $14K OBO.; '85 Mustang GT, t-tops, loaded, mech perfect, $3.5K. Bill, x34455 or 280-0060.

'83 Ford F150 PU, 302V8, auto, new eng, brakes, tires, AM/FM, AC, $2.5K. 326-2808.

'89 Bronco Eddit Bauer, blue/tan, new goodyears, new batt, muffler, tailpipe, 302 V8, auto, overdrive, running boards, 52K mi, $12.2K. 480-7999.

'84 XLT Ford F150 Supercab, 302 V8, auto, AC, PS/PB, $2K OBO. 409-938-3856.

'72 Pontiac Ventura, 4 DR sedan, good cond, $400. Ray, 283-5824.

'85 Isuzu Impulse, AC, AM/FM stereo, cruise, 5 spd, 100K, runs good, $2.2K. Leonard, 922-6484.

'91 Chrysler Lebaron Coupe, red, auto, alarm, 33K mi, 2.3L eng, $8.8K negotiable. 286-7046.

Boats & Planes

O'Brien water skiis, good cond, $40 OBO. Kristal, x30804 or 585-6789.

'92 Cajun Fish-n-Ski, 120 HP, Johnson O/B, 17' w/trlr, trolling motor, spare tire, cover, ex cond, $12K OBO. Jennifer, x39977 or 326-5206.

16' Cobra walk thru boat, galv trlr, elect winch, %5.50; ss prop, 70 thru 100 HP, Johnson or Evinrude, $100. 409-935-9250.

Wind Wing 6.7 windsurfing sail, good cond, $100. Mike, 283-5890 or 868-5132.

Cycles

Woman's Schwinn bike, woodlands on/off road, teal, 5 spd, was $260, sell $225. 332-6681.

Nishiki Prestige 12 spd racing bike, 60 cm Scott aerobars, sugino cranks, Suntour 5000 derailers, shifters, anodized wheels, cycle computer, ex cond, $350. Rick, 554-6265.

'89 Kaw EX500, 5K mi, $2K. Tim, x34499 or 286-8434.

Audiovisual & Computers

Compaq portable computer, original model, $725. Mandell, 283-5458.

Emerson stereo, 5 yr old, w/2 spkrs, turntable, duel cassette/recording, $60. 332-6681.

Atari Mega St2, 2 MB RAM, mono monitor, 30 MB harddrive, KB, mouse, $450 OBO. Jeff, x35534 or 480-6839.

1 BM software for sale or trade, childrens games, Mickets, ABC's-1,2,3's, $10/ea or $50 for all. Wayne, 282-3118.

Sylvania compact disc, 16-bit, oversampling programmable, single disk, $80. 282-4587.

IBM XT, 640K, 2 FD, 40 MB HD, color monitor, software, $325. Kyle, 283-8233.

Ampeg amp w/spkr cabinet, cabinets has 2-15"spkrs, needs repair on amp, $100/ea or $200 for both. Mike, 283-5890 or 868-5132.

AT&T 6300 computer, color monitor, 20 MB HD, $400. 333-4460.

Commodore video monitor 1702, disk drive 1541, Gemini 10xz printer, computer cabinet, Linda, x32745 or 480-3187.

Sound design stereo rack system w/turntable, all components, 2 Juliette AM/FM/8 track recorder w/turntable, spkrs, Sony Beta Max VCR; Sylvania stereo tv w/remote, all items best offer. Ray, 283-5824.

HP 285 advanced scientific programmable calculator, 32K, fully alphanumeric w/built-in calculus/solver functions, manuals incl, $110. Steve, 480-8357.

Photographic

Minolta Maxxum 500i SLr 35mm camera, 28-70 mm f3.5/4.5 auto-focus, zoom lens, built-in flash, self-timer, accepts creative expansion programmable card, $400 OBO. 481-8287 or 283-7536.

Pets & Livestock

Bobwhite, cortunix quail, adult, chicks, eggs. Ken, x45152 or 409-925-4438.

Cockapoo pups, blk, females, avail 10-5, $50/ea. 996-0981.

Rabbits, mini lops, fuzzy lops. Gailo, 554-6200.

Free kittens. Denise, x37417 or 326-4336.

Free kitten, approx 2-3 mo old, house trained, dark gray/blk. Kelley, 283-5466.

Chihuahuas AKC, shots, wormed, 4 and 8 nbos. old, should weight 4 lbs full grown, $125. 534-3893.

Musical Instruments

Bach silver strad trumpet, model 37, ex cond, $600. Kathy, x39190 or 332-6305.

Lost & Found

Found in PaO, bldg 2, Polaroid 600 land camera, model Sun600 UMS. x35111.

Found, landies ring in bldg 1 elevator. Call and describe to claim, x31284.

Household

Couch, ottoman, $50. Brenda, x35965 or 280-0757.

Two twinbeds, headboard/footboard, frames, $75; sofa/chair, $100; coffee & end table, $75. Tom, x31281 or 480-6075.

Ivory day bed, $200 OBO. Trudy, 333-6688 or 334-7211.

Queen sz sleeper sofa, 474-3517.

Full sz box spring, matt, frame, $90 OBO; antique anwar w/mirror, $85 OBO. Donald, 244-4300.

Daybed, oepns out to sleep 2, $60. 482-5621.

Twin beds frames, 1 box spring, $60. x31883.

Hide-a-bed, $250; Danish-modern dresser/mirror, $100; Colonial desk, $125; Spanish queen sz headboard, night stand, 2 small dressers, mirror, $200; Queen sz matt, $150; desk chair, $25, all in good cond. 488-0189.

Beige contemp loveseat, good cond. Lisa, 474-5609.

5 pc Rattan breakfast table, chairs, 48" glass top, ex cond, $250; ceramic kiln, $150. x45178.

Dining rm table, chairs not incl, wood stained finish, $80. x36135.

Persian carpet, 100% silk, handmade, 3.5 x 5.5, wall masterpiece, $4K; Persian carpet, wool w/silk flowers, handmade, 10 x 12, $3.5K. 488-0345.

Singer sewing machine in cabinet, ex cond, $100. x34121 or 482-6651.

French provincial couch, loveseat, recovered, refinished, tuffted backs, $600 OBO.

Sleepr loveseat, beige stripe, $130; extension table, side board, dark wood, 50" wide, $90. 333-9733.

Round dining rm table, 4 chairs, $115; gold upholstered chair, ex cond, $135. 333-4460.

Lg brass orante round tray on stand-suitable coffee table, $100; pair mahogony English butler end tables, $175; wall cabinet, 56" long x 29" tall, 2 drs, $35. 488-5564.

Kenmore washer, needs $60 part, free; elec storve, needs two burner units, $40. Sarah, 554-6741.

Full sz Kenmore elec W/D, $400 for both. 283-4258 or 996-5689.

Armchair, stereo stand, 4' x 6' turkish rug. Linda, x32745 or 480-3187.

Fifty pc stoneware set, incl 8 place settings plus some accessory pcs, $35. Kari, x38649.

Sleeper sofa, floral print, earth tones, 2 ottomans, &75 OBO. Shelley, x37824.

Bdrm suite, queen, 2 night stands, dresser, chest-of-drawers, mirror, headboard, $400. 996-7814.

Wanted

Want nonsmoking female roommate to shae house in CL, $250/mo plus 1/3 util. Theresa, 333-6491 or 480-6980.

Want to buy an inexpensive work car, minor repairs OK. 486-4700 or 280-2239.

Want matt, box springs for dbl bed, will trade for twin matt, box spring, and frame. 532-1409.

Want '84 or earlier remote unit for Sears garage dr opener, working or not. 326-2307.

Want bunkbeds or stackable twin sz beds, don't need matt. 283-5480.

Want vanpool riders from Northwest Houston to NASA area. Wendell, 333-6050 or 466-3203.

Want vanpool rider from West Loop Park-n-Ride to NASA area. Richard, x37557.

Want reasonably priced canoe, x38843 or 332-6153.

Want Appleworks, version 3.0 for Apple IIE. 326-2307.

Want vacuum tube checker in good working order, 992-3876.

Want working FM stereo amp w/inputs for phono or aux, must have outputs for 2 or 4 8 ohm spkrs, any age ok. Michael, x38169 or 482-8496.

Want by 11-1-92 small house, effic or gar apt, resonable rent, stable/responser, pet owner, refs. 846-0696.

Want Starwars: spaceships, toys, figures, books. Ron, 482-1385.

Want female roommate to share 3 BR house in Seabrook, nonsmoker, $370/mo incl util. Ann, 282-3790.

Want inhome chilcare for infant, CLC, children/caregiver ratio 4 max. Chris or Michelle, 486-0487.

Want to share nanny in our homes, prefer child under 2, No. CLC. Chris or Michelle, 486-0487.

Want exercise bike/equip, good working cond. Mandal, 333-6001 or 498-5400.

Want telephoto lens for Minolta camera, manual focus, fixed focal length at least 500 mm. Gary, x37896.

Want stained glass grinder in good cond. Gloria, 480-2771 or 485-7555.

Want carpool riders from JSC to Heights. x35785 or 861-6646.

Miscellaneous

Elec Pwr Stride II treadmill w/elec display, ex cond, $200. 489-9677.

Treadmill, Lifestyler, lift assist, 2 handle, digital readout, was $400, sell $225. x34557 or 337-4245.

Jennings 22-LR handgun; semiauto, nickel plated w/5 shot chip, instructions, parts list, $65. Terry, 282-4942 or 474-5639.

Lawnmower, $70; women's 10 spd bike, Beta VCR, $90; hi quality stereo, hand-crank medical bed; RCA VHS camcorder, $800. Tim, 996-9191.

Stairclimber, Precor 730e, works both arms/legs, digital readout w/training video, $350 OBO. Greg, x31427 or 992-4307.

Yakima rack w/locks, raingutter style, $100. Troy, 485-5605.

Murray walk behind pwr mower, rear bagger, Briggs and Stratton 4 HP eng, 21" cut, $75. Brent, x36456.

10" Carftsman radial-arm saw, table, $200. 488-0189.

Air compressor, 3 HP, 12 cfm, 29 gal, regular, throw switch, $295; Technic spkrs, 140w, 8 ohms, $60/pr. Sonny, 992-3715.

The Furniture Idea Gift cert, $1067 value, sell for $967, expires March '93. Karen, 538-3444.

.380 auto Walther PPK lone, 2 magazines, $180; 9mm 14-shot, 2 magazines, $280. John, x36956 or 332-1570.

Smith & Wesson, model 27, 357 magun, 6" barrel, $275. 486-7245.

Tutoring service, exp teacher will provide tutoring for students in K - 5. Rachel, 480-2464.

7 day Florida/Bahamas cruise vacation pkg, $400 for 2 people. Michelle, 283-5542.

French Provencial bdrm suite, mini 14, P85 stainless, Mossberl 500, guns w/extra clips and ammo. Bill, x34455 or 280-0060.

Johnson alum propellers, 3 O.D. x 15" pitch, one new, $35; one used, $25; Singer vacuum cleaner, $50. 332-9105.

Dormeyer mixer, $22; Panasonic PC computer, mono monitor, 640K RAM, 30 MB HD, modem, word processing software, int clock, manuals, $600; barometer w/humidity temp, $10; small round formica top table w/2 antique Bentwood chairs, $100. 488-5564.

Engagement ring, 18K yellow gold, round dia solitaire, .68 carats, w/6 round dia, .18 carats, was, $1.5K, sell $1K. x30874.

Two tickets for Oilers-Broncos game in Denver, Octo. 18. Robert, 326-3022.

Three 6 x 12 x 6 dog kennels, $150; portable puppy pen, $50; 4' chainlink gate, $50; MEC Versamec 700 reloader, 20 ga., $50. Mark, x38013 or 992-4132.

Remote control airplaines, unassembled, pilot kits, spitfire MK111, Focke Wulf 190, $80/ea or both for $150. Tim, x36370.

White foxtail jacket, $150; full set of golf clubs, ladie's Judy Ranking by Ram, irons, woods, putter, wedge, shoes, sz 8. $150. x34236.

Hex dome tent w/sleeping pades, $25. Randy, x32570.

O'Brien water ski, World Team Comp, 68", $45 OBO; bowling ball, 16 lb, undrilled, bag, $25 OBO; DP ultra Gympac or DP Octagym, bench press w/free weights, $300 OBO. 280-2546.

Ladies rolex, gold/stainless, datejust, oyster, perpetual, $2.5K. 996-7814.

How Tough Is Tough?

JSC workers designed, built STS-46 experiment to gather information on how hardy space materials need to be

By Kyle Herring

Investigators at JSC waited patiently throughout *Atlantis*' last mission for their turn to gather data that would be used to better understand how the space environment causes different kinds of materials to deteriorate.

But while the Evaluation of Oxygen Interaction with Materials experiment didn't receive the publicity of the Tethered Satellite System or the European Retrievable Carrier, it did gather information important to America's future in space.

The early STS-46 EOIM findings show that — depending on their use and life expectancy — different types of materials and coatings can be used to protect against space environment contamination.

"There are certain polymers that we wouldn't use for 30 years in space, but that we would use for two or three," Steve Koontz, a principal investigator on the EOIM (Evaluation of Oxygen Interaction with Materials) experiment, said.

Flown jointly on the STS-46 mission with the Thermal Energy Management Processes (TEMP 2A-3) experiment, EOIM was designed to obtain accurate measurements of the interaction of different spacecraft materials with atomic oxygen, which is prevalent in low Earth orbit.

In fact, he said, atomic oxygen has been found to be prevalent in low Mars and Venus orbits making the studies useful for advanced spacecraft designed to visit those planets as well.

While not the first flight of EOIM-type payloads, STS-46 allowed for the longest period of continuous oxygen interaction with the experiments located on an experiment support structure in the rear of the payload bay as the orbiter was pointed with the experiments facing in the direction of travel.

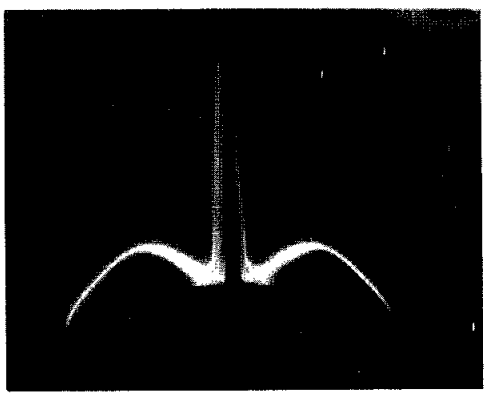
Data collected from this 40-hour cycle is being used to help determine suitable materials for long-duration space structures, including Space Station *Freedom*. The studies will continue for the next several years.

The problem is developing materials that can stand up to the 30-year life expectancy of the space station, said Koontz, who works in JSC's Structures and Mechanics Division.

"The 30-year life requirement is a real stumbling block. We haven't had a spacecraft flying for 30 years," he said.

Using a mass spectrometer, investigators are able to calibrate ground-based systems located at the Phillips and Los Alamos National Laboratory facilities.

"The quick look at the hardware and data shows we're pretty close," said Lubert Leger, principal investigator for EOIM and chief of the Materials Branch in Structures and Mechanics.



From a hardware standpoint, all systems performed well allowing for full data gathering from the EOIM instruments, said Mike Richardson, mission manager for the experiment from the Space Shuttle/Space Station *Freedom* Payloads Projects Office.

"Everything I've heard indicates we got more mass spectrometer data than expected," Richardson said.

"Whenever you do integrated testing on the ground you're always a little concerned that the equipment will work as well in space as it did on the ground during checkout. In this case everything worked well and we believe the scientists got all the data they needed," he added.

EOIM was designed, fabricated, assembled and tested at JSC. Total cost of the experiment, including payload integration and operation, was about $3 million, Richardson said.

Among the key people who worked on the project were Mike Pedley and Jim Visentine, also of the Materials Branch, who were part of the principal investigation experiment team. Bill Wood of Center Operations' Technical Services Division oversaw the fabrication and assembly of the flight hardware in Bldg. 10. Lou Jones and Cullen Wright were Lockheed Engineering and Science Co.'s project managers for EOIM. Lockheed's Bruce Hsieh oversaw the thermal analysis work. Lockheed's Sam Choudary performed the mechanical design work, and Steve Dansby was Lockheed's electrical systems designer.

"We can't say enough about the effort the Tech Services people did to make this happen," Richardson said.

As early as the second space shuttle mission, investigators throughout NASA began detailed evaluations of the effects of the space environment on various materials that eventually would be used in spacecraft designs.

Called the Induced Environment Contamination Monitor or IECM, the experiment flew on STS-2, 3 and 4. "From a contamination standpoint, we saw changes in the thermal blankets that indicated something was going on, probably associated with oxidation," Leger said.

Prior to the fifth shuttle mission, enough work had been done to understand "that it might be a problem for long-term space flights," he said.

During that mission, "we got a significant amount of data," but the orbiter's payload bay was not pointed directly into the direction of travel, Leger said.

What turned out to be bad luck for the Tracking and Data Relay Satellite program proved lucky for the EOIM people. The satellite scheduled as the primary payload on STS-8 wasn't ready in time and EOIM was given its second chance to fly.

"We turned the hardware around in a month and a half and got our first substantial exposure pointed into the velocity vector for 40 hours," Leger said.

About the time of the announcement in 1984 beginning the space station program, investigators proposed a third flight of the EOIM hardware to verify models on the ground.

Detailed measurements of the amount of atomic oxygen were compared with ground-based instruments to better understand how to simulate the environment.

"We got two additional bits of data," Leger said, when hardware was returned from the Solar Maximum Mission satellite in 1984 and when the Long Duration Exposure Facility was retrieved in 1990.

The data from samples looked at and compared correlated "quite well" with that from the STS-8 mission, he said.

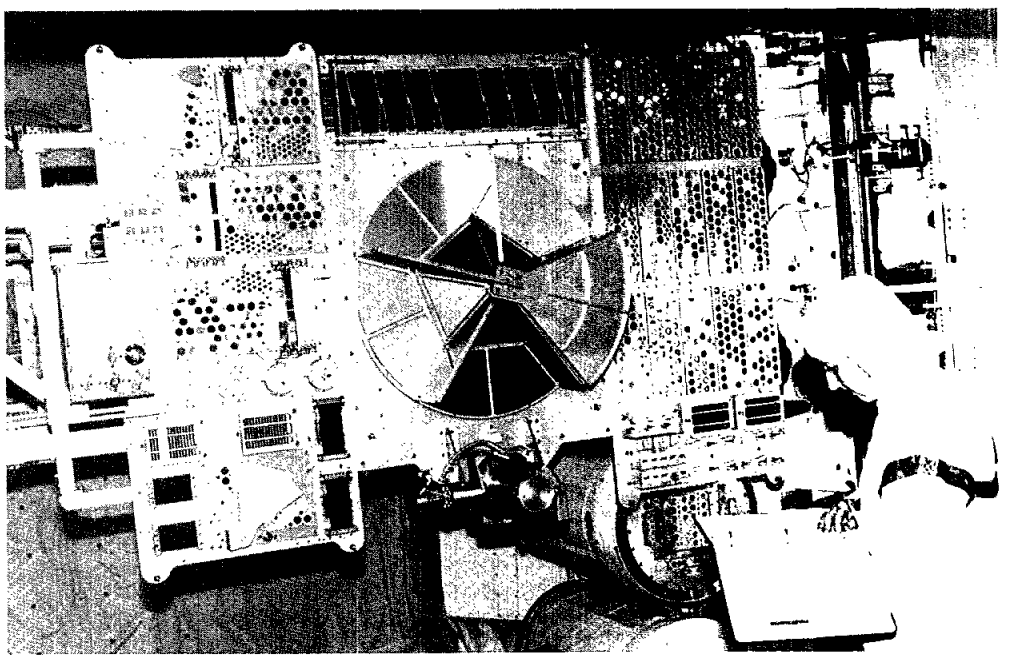
One concern that was addressed was one of ambient density loss, the loss of material layers from the spacecraft.

LDEF lost only about 12/1000 of an inch during its six-year stay in space which indicated the ambient density concern "was not a major problem," Leger said.

Small segments of the solar arrays to be flown on Space Station *Freedom* were aboard *Atlantis* as part of the STS-46 EOIM experiment and demonstrated acceptable tolerance to the atomic oxygen presence, Koontz said. Lewis Research Center investigators say "their examination shows no problem with the solar array samples. They should last 10-15 years."

While STS-46 was the last planned flight of the EOIM experiment, both Leger and Koontz say new materials are being developed that may generate interest in terms of how they react to the space environment.

Future experimentation could consist of sample material flights in Getaway Special canisters in the payload bay or as attached payloads on the space station once it is launched and assembled.



NASA Photos

Top: JSC's Mike Pedley, Bill Wood and Jim Visentine check out the mass spectrometer used to analyze the composition of molecules that hit the EOIM carousel. Center: STS-8 photography recorded visible evidence of atomic oxygen interaction with materials. Left: Lockheed's Lou Jones, left, joins Wood and Lockheed's Bruce Hsieh, Sam Choudary and Steve Dansby in checking out EOIM hardware in Bldg. 10. Above: KSC's Sharon Walchessen, TSS and EOIM experiments project engineer, inspects EOIM at the launch pad.

STS-53 mission eschews portion of secrecy cloak

(Continued from Page 1)

den. The crew has been training to hover over the autoland system and be ready to jump in if things appeared to be going awry.

"The decision to delete the autoland DTO from this flight doesn't necessarily mean that autoland systems, per se, are dead," Walker explained. "Autoland capability has been a part of the shuttle software really since the first flight. What this test would have done would have been to give us a data point that we might be able to use later on as the beginning for an improvement in the autoland system."

GLOW is an extreme ultraviolet imager and spectrograph that will measure the interaction of atomic oxygen with shuttle surfaces.

"We're going to be looking at the interaction of the orbiter with the high atmosphere, also looking at the glow off the orbiter, the glow in the Earth's limb, interaction of the primary and vernier reaction control system jets with the atmosphere and also interaction with debris through water dumps," Cabana said.

Two cryogenic heat pipes, one built by Hughes Aircraft and the other by TRW, will test liquid oxygen as a transport medium. Heat pipes are used to dissipate heat on spacecraft.

Cabana also will be working with an experiment to produce microcapsules in space. That middeck experiment will make 50 micron spheres of ampicillin coated with a polymer. Such microcapsules could be used in antibiotics that would be poured directly into wounds and emit time-released doses.

Deployment of DOD-1 will be Mission Specialist Guy Bluford's primary responsibility, but after that task is completed he will begin working with the experiment to quantify human tissue loss during space flight, and with the CLOUDS 1A experiment to correlate the variation in cloud cover from different angles with satellite photos.

Mission Specialist Jim Voss, the flight engineer, will work with Bluford on the Hand-Held, Earth-Oriented, Real-Time, Cooperative, User Friendly, Locating Targeting and Environmental System. HERCULES will test the ability of a hand-held electronic still camera fitted with an inertial measurement unit to precisely identify the latitude and longitude of photos of the Earth's surface.

Voss also will work with the Fluid Acquisition and resupply experiment to study how to fill, refill and void simulate propellant tanks without umbilical lines.

Mission Specialist Michael Clifford will deploy spheres that will be used to calibrate ground-based radars and telescopes that track orbital debris. The Orbital Debris Radar Calibration Spheres experiment will release six spheres of three different sizes from the payload bay. The stainless steel and aluminum balls will help calibrate the instruments so that they can monitor smaller orbital debris.

U.S. instruments to fly on Russian probe in 1994

(Continued from Page 1)

with Russian Ministry of Foreign Affairs officials to review the U.S./Russian space relationship.

An experienced cosmonaut will fly aboard STS-60, scheduled for launch in November 1993. RSA has nominated Col. Vladimir G. Titov and Sergei K. Krikalev as the two cosmonauts who will undergo mission specialist training.

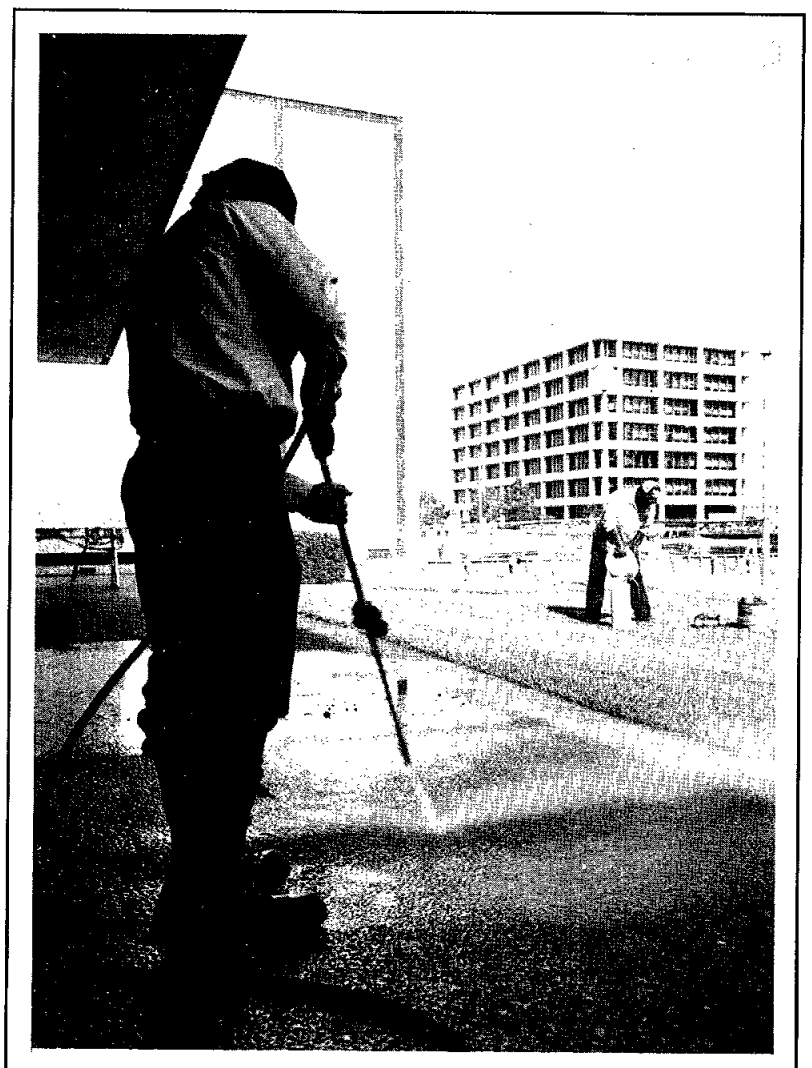
A NASA astronaut will fly on a long-duration (more than 90 days) Mir flight. The flight's timing will coincide with a shuttle docking flight in 1995. The astronaut will be flown to the Mir on a Soyuz spacecraft. The astronaut's duties will focus on science, particularly life sciences, as well as engineering and operational objectives.

Two NASA astronauts will receive full cosmonaut training with their cosmonaut crewmates at the Yuri Gagarin Cosmonaut Training Facility "Star City" near Moscow. They will begin training no later than 12 months before the agreed flight date. One astronaut will be selected as the prime crew member and the other will be designated backup crew member.

NASA will transport two cosmonauts in the shuttle to replace the two cosmonauts on board Mir. Life sciences experiments, involving the NASA astronaut and the two cosmonauts on board the Mir, will be conducted while the shuttle and Mir are docked. The NASA astronaut and the two cosmonauts who have been on the Mir will be returned in the shuttle to the United States for continued post-flight life sciences experiments.

The primary objective of the Russian Mars '94 mission is to carry out further joint exploration of planet Mars. This may provide the opportunity for U.S. scientific instruments to be carried aboard the Russian spacecraft. This cooperation could significantly enhance the present Mars '94 mission and provide critical data for future human and robotic Mars missions.

One U.S. instrument is the Soil Magnetic Properties Experiment, and the other is the Soil Reactivity/ Composition Experiment. These will enable scientists to characterize the Martian physical and chemical surface environment.



JSC Photo by Bob Walck

SPRAY AND WASH—Johnson Controls workers Oscar Aldrete, left and Juan Leon pressure wash the sidewalk outside Bldg. 16. The on-going maintenance program by Center Operations Special Purpose Maintenance and Services Office is designed to wash out the mildew and dirt that build up between the gravel in the sidewalk and on the buildings' walls.

Television series should help workers understand metrics

As part of National Metric Week activities, a series of six familiarization programs will be broadcast on the JSC Television Distribution System beginning Tuesday.

The series, "SI Metric for the Workplace," is essential to anyone not accustomed to working with the international system of measurement, according to JSC Metrication Committee Chairman Joe Maloy.

"Introduction to Metric" will air at 1 p.m. Tuesday and put into perspective why many American companies and the federal government are adopting the metric system.

"Units of Measure" will air at 2 p.m. Tuesday and explain common prefixes and the metric approach to measuring mass, length and force.

"Reading and Writing Rules" will air at 1 p.m. Wednesday and provide an editorial guide to metric rules for spelling, symbols, numbers and units.

"Limits, Fits and Tolerances" will air at 2 p.m. Wednesday and explain how to read and specify limits, fits and tolerances in metrics.

"SI Conversion, Part 1," geared for the engineer, will air at 1 p.m. Thursday and explain hard and soft conversion.

"SI Conversion, Part 2," will air at 2 p.m. Thursday and explain how to use conversion tables and other metric conversion factors.

Check the TDS program guide for the correct channel.

Bldg. 3 cafeteria to begin catering only to employees next Friday

The Bldg. 3 cafeteria will open its doors to tourists for the last time on Thursday and begin catering to employees only next Friday.

Plans are under way to expand the Bldg. 3 salad bar to include hot soup and sandwiches. A recent survey of cafeteria food and services conducted by the Employee Activities Association will be used as a basis for planning facility changes to be accomplished later.

Bldg. 3 hours of operation will be the same as those of the Bldg. 11 cafeteria, from 7 a.m.-2 p.m., and Bldg. 3 will begin serving breakfast specials similar to those in Bldg. 11.

In addition, the Bldg. 3 JSC Exchange Store will close Thursday and be used to provide additional cafeteria seating. Employees may continue to buy some souvenirs, business cards, discount tickets, and other items in the Bldg. 11 exchange store from 10 a.m.-2 p.m. Monday through Friday.

Cosmonauts bring extensive experience to training

(Continued from Page 1)

Air Force College in Chernigov, Ukraine, in 1970, where he served as a pilot-instructor until 1974. Titov has flown 10 different types of aircraft, has logged over 1,300 hours flying time and holds the qualifications of military pilot, first class and test-pilot, third class.

Titov was selected to join the cosmonaut team in 1976 and in September 1981. He made his first space flight as commander of Soyuz T-8, launched April 20, 1983. Titov was supposed to dock with Salyut 7, but was unable to because the Soyuz rendezvous radar antenna failed to deploy properly. After several attempts, Titov aborted the rendezvous to avoid a crash and returned to Earth after a flight lasting just over two days.

Titov next served as backup for the Soyuz T-9 mission launched June 27, 1983.

Titov was onboard Soyuz T-10 on Sept. 27, 1983, which caught fire one minute before launch when a propellant line valve failed to close at T-90 seconds. The fire quickly engulfed the rocket, but controllers were able to pull the Soyuz descent module clear by the launch escape system. The crew landed safely some 2.5 miles (4 km) from the launch vehicle.

In 1987 he graduated from the Yuri Gagarin Air Force Academy while working at the Yuri Gagarin Cosmonaut Training Center.

Titov was commander of the Soyuz TM-4 launched Dec. 21, 1987. Titov and Musa Manarov set a new record for long duration in space of 365 days, 22 hours and 89 minutes. Upon his return to Earth, Titov was awarded the title of Hero of the Soviet Union and also received his second Order of Lenin. In addition, the French awarded him the title of Commandeur de la Legion d'Honneur and in 1990, he and Manarov were awarded the U.S. Harmon Prize — the first Soviet citizens to win the award — in recognition of their world endurance record.

Krikalev was born on Aug. 27, 1958, in Leningard. He completed his studies at the Institute of Mechanics in Leningrad in 198l, and then worked in a design bureau where he participated in the creation of new space technology devices. He is involved in sport aviation and holds a master of sport in sport aviation.

Krikalev began cosmonaut training in November 1985 and made his first space flight as flight engineer onboard Soyuz TM-7, launched Nov. 26, 1988. Krikalev returned to Earth after having spent 151 days, 11 hours and 8 minutes in space. His second flight aboard Mir was from May 18, 1991, to March 25, 1992 (312 days).

Upon his return, Krikalev was awarded the title of Hero of the Soviet Union and also received the Order of Lenin. In addition, the French awarded him the title of L'Officier de la Legion d'Honneur.

JSC Clinic to offer flu shots again

The JSC Clinic will offer free flu shots again this year, beginning Tuesday.

The influenza vaccinations are recommended for people who want to reduce their chances of contracting the flu, and for three high-risk groups — those with heart disease, chronic bronchopulmonary diseases such as asthma or emphysema, or diabetes mellitus and other chronic disorders.

Vaccinations will be administered daily between the hours of 10 a.m. and noon and 2-3:30 p.m. For more information, call the clinic at x34111.

Search most comprehensive yet

(Continued from Page 1)

in Puerto Rico and is operated for the National Science Foundation by Cornell University.

The Sky Survey will use the 34-meter antennas at NASA's Deep Space Network sites in the northern and southern hemispheres to scan the entire sky over the frequency range from 1,000 to 10,000 megahertz. The Sky Survey begins at Goldstone, Calif.

"Because of the large increase in the area of sky and frequencies covered, a signal will have to be stronger to be detected by the Sky Survey," Billingham said. "But it could detect signals emitted in distant regions from directions that would be overlooked if the search were limited to nearby solar-type stars."

Space News Roundup

The **Roundup** is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Dates and Data submissions are due Wednesdays, eight working days before the desired date of publication.

Editor .....Kelly Humphries
Associate Editor .....Kari Fluegel

Young earns high honor

(Continued from Page 1)

Gemini 10. In 1969, John made his first trip to the Moon aboard Apollo 10 and returned three years later to become part of the world's most elite fraternity: one of the 12 men to walk on the Moon."

"For most people, that would have been enough accomplishment for one lifetime. But not John. He waited almost a decade, then became the ultimate test pilot by taking the space shuttle for its first flight into space. In 1983, he set a new record as the first man to make six flights into space."

Young, 62, currently serves as special assistant to the JSC director for Engineering, Operations and Safety.

Prior to this assignment, he was chief of the Astronaut Office from 1974 to 1987. During that 13-year period astronaut crews participated in the Apollo-Soyuz joint American-Russian docking mission, the Shuttle Approach and Landing Test program and 25 shuttle flights.

"Imagine being in an outfit like I've been in for 30 years where every day you come to work you find out something you never heard of before in your life," Young said. "And imagine being able to work with young men and women who are so dedicated and talented like we have in this agency. I hope I can do it another 30 years because this is the future, boy, space exploration."